



Armed Forces College of Medicine AFCM



Wrist & hand joints

Prof. Dr. Hussein Mohamed
Ass. Professor of Anatomy

INTENDED LEARNING OBJECTIVES (ILO)



By the end of this lecture the student will be able to:

- 1. Describe type, articular surfaces, fibrous capsule, synovial membrane, ligaments, movements, arterial & nerve supply of wrist joint**
- 2. Identify type and movements of small joints of hand.**

What do you see ?



Wrist joint

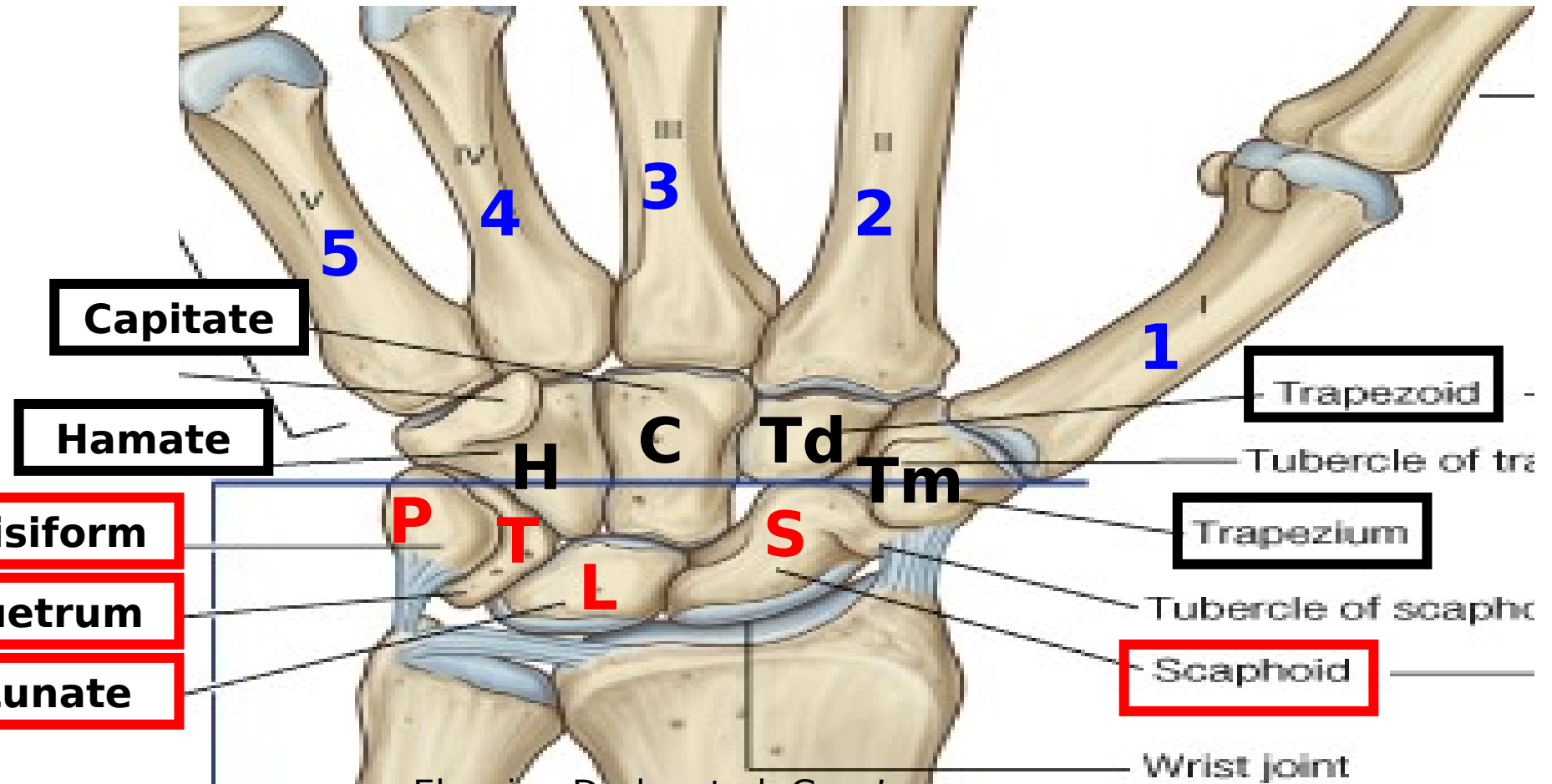
Carpal & metacarpal bones



▪Carpal bones are arranged in 2 rows:

Proximal (4) & distal (4).

▪Metacarpal bones are numbered 1-5 from lat. to med.

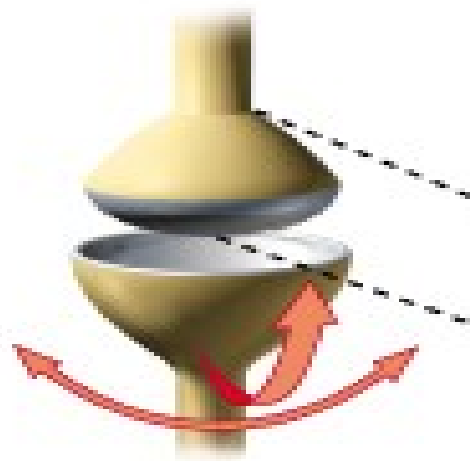


Elsevier. Drake et al: Gray's anatomy for student- www.studentconsult.com

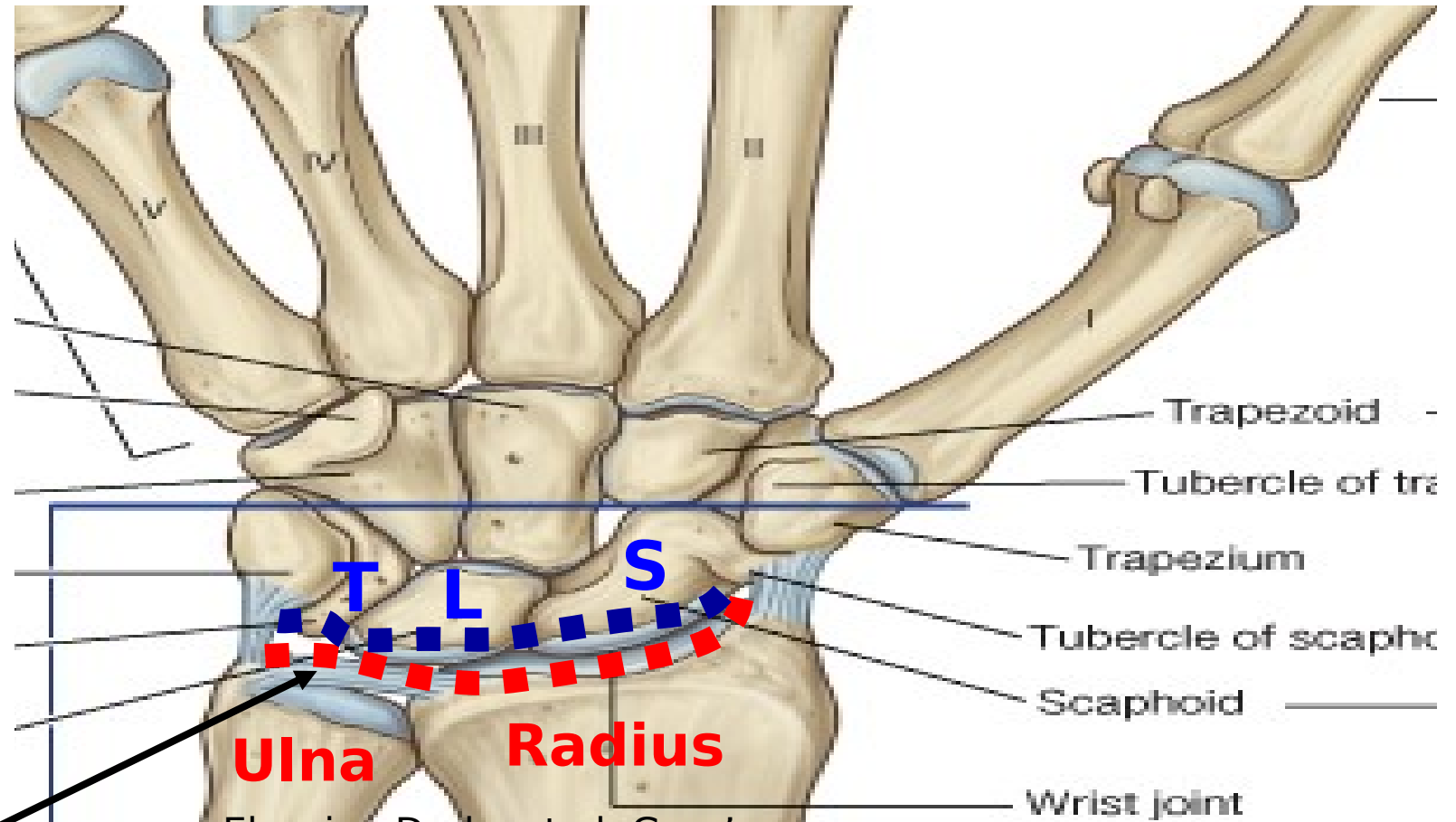
Articular surfaces of wrist joint



Type:
Ellipsoid

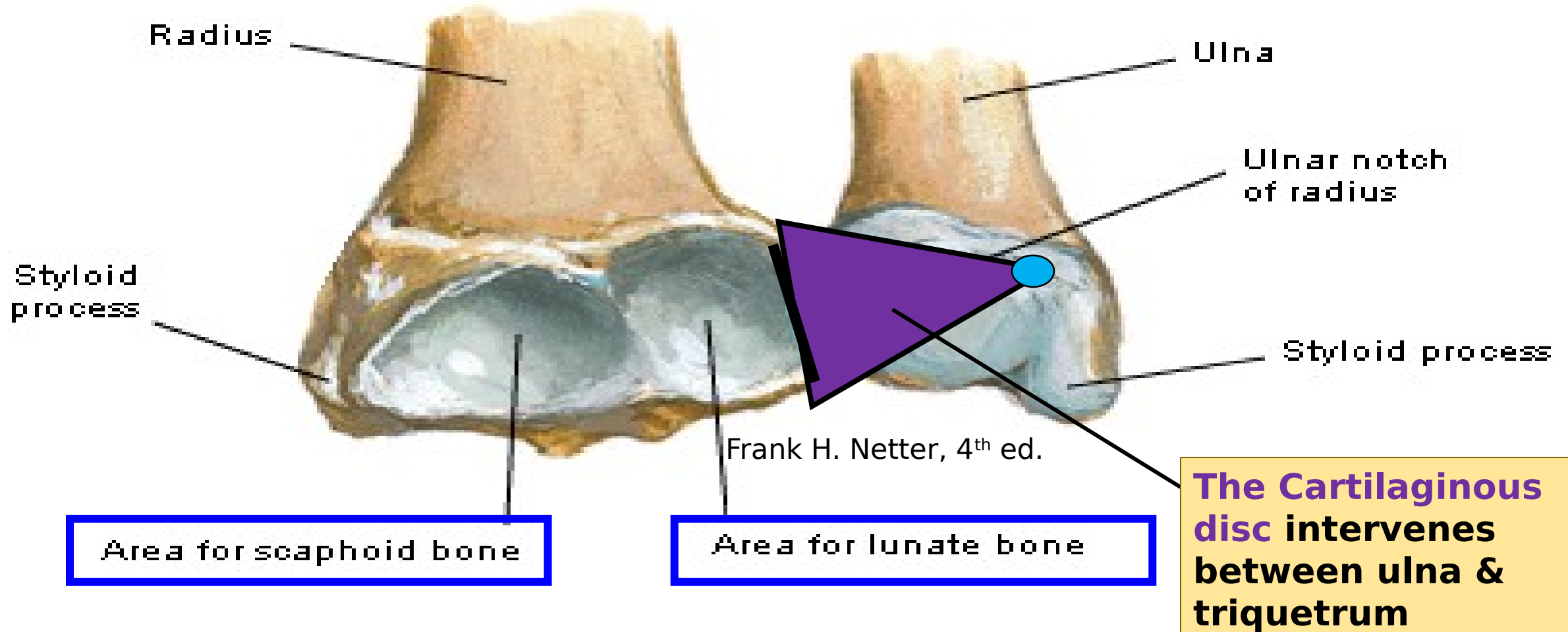


Articular disc



Elsevier. Drake et al: Gray's
anatomy for student- [www.
studentconsult.com](http://www.studentconsult.com)

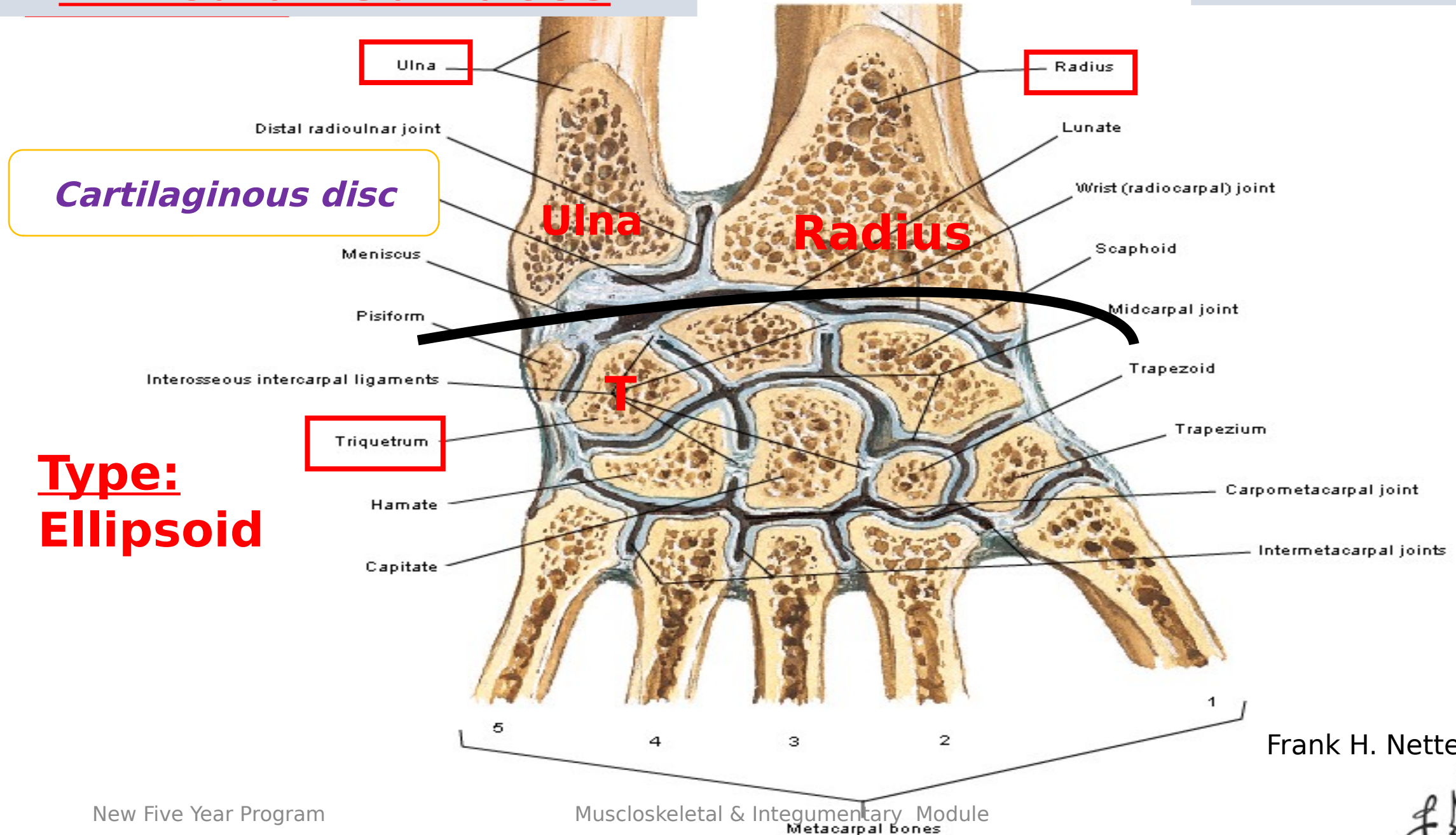
Articular surfaces & cartilaginous disc of wrist joint



It is attached to inf. surface of **ulna** (in the groove bet. Head & styloid process) & on the **radius** (inf. border of ulnar notch)

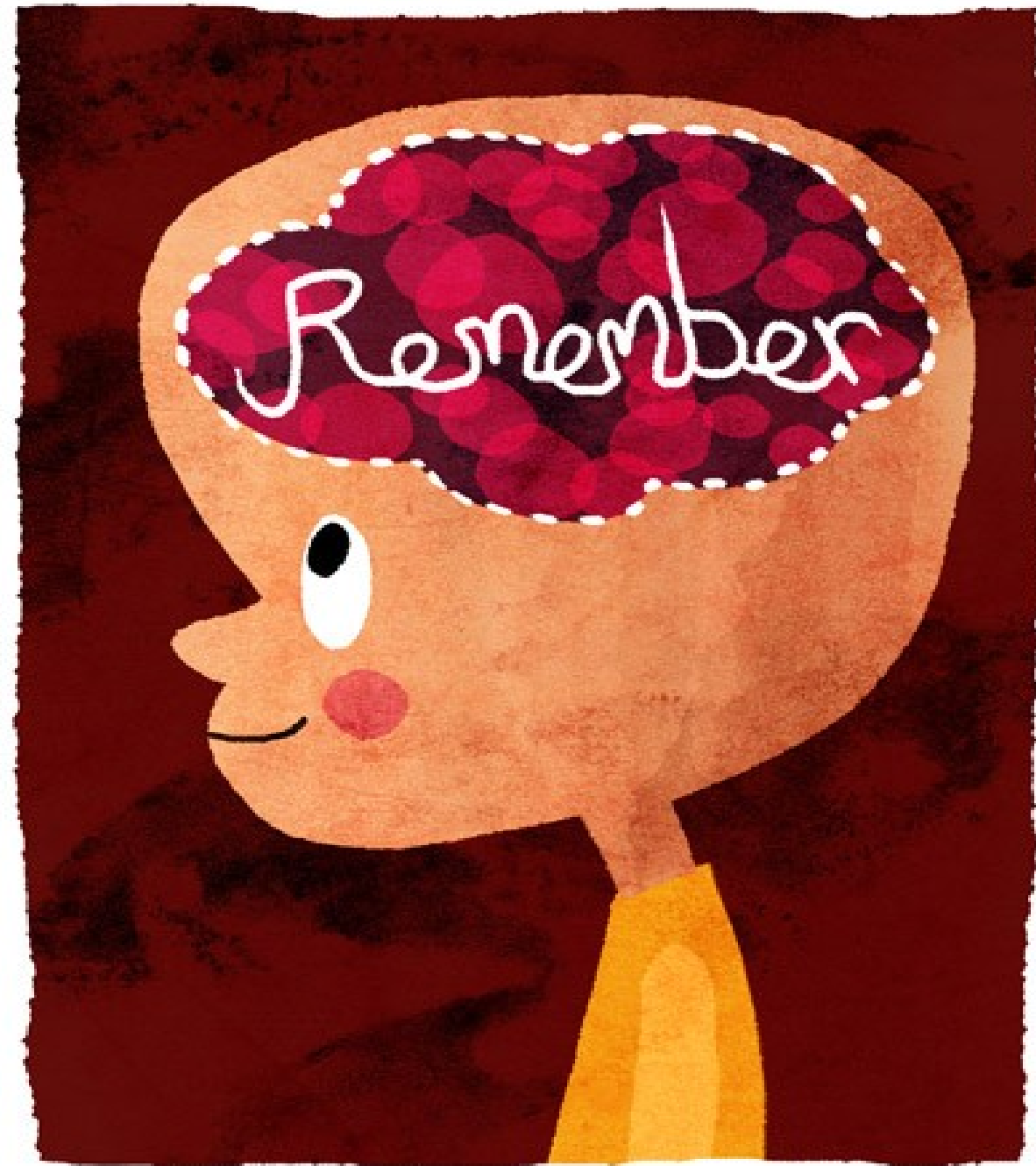
Articular Surfaces

Cut Section

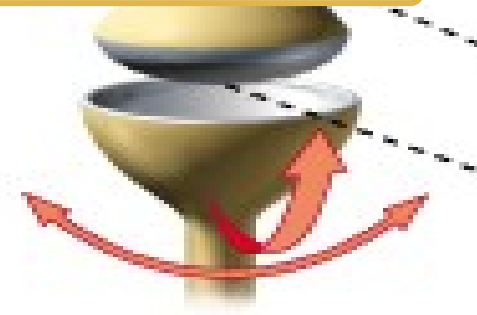


Frank H. Netter, 4th ed.

- **Ulna does not share in the wrist joint.** That is why this joint is called the **radiocarpal joint**. Head of ulna is separated from the carpal bones by the triangular articular disc



Wrist (Radio-carpal) joint



- **Type:** Synovial (Ellipsoid).
- **Articular Surfaces:**
 - 1- **Proximally:** Lower end of radius & cartilaginous disc.
 - 2- **Distally:** Scaphoid, lunate & triquetrum.
- **Capsule:** attached to the margin of the articular surfaces.
- **Synovial membrane:** Lines the inner surface of the capsule.

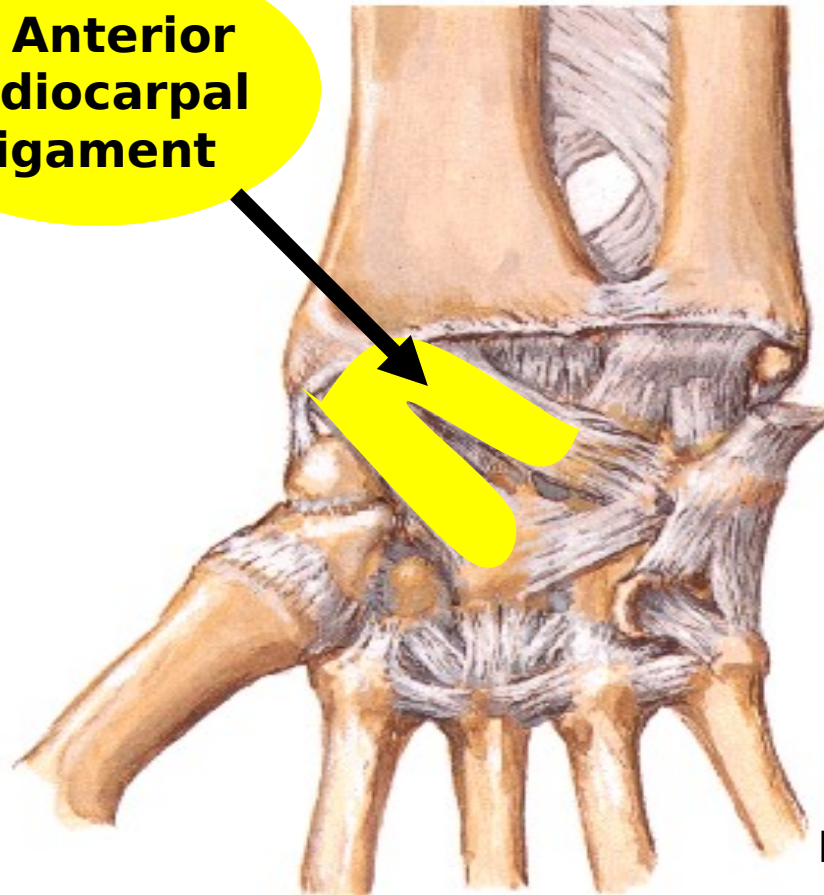
Ligaments of wrist joint



Ligaments of Wrist

Flexor Retinaculum Removed - Palmar View

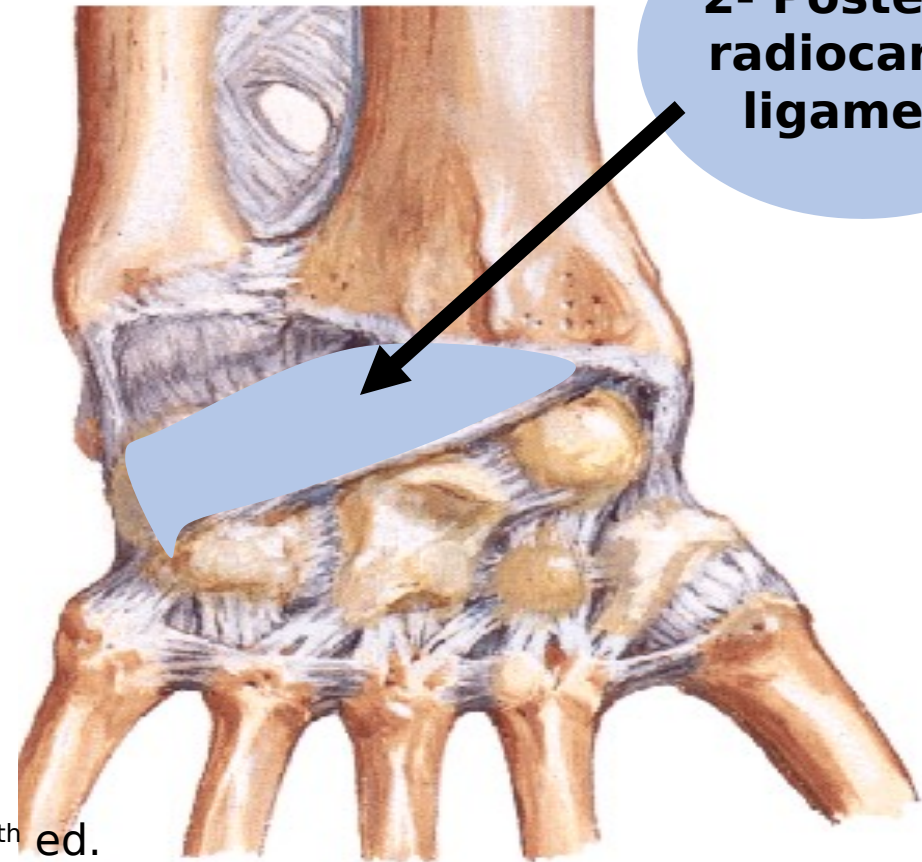
1- Anterior radiocarpal ligament



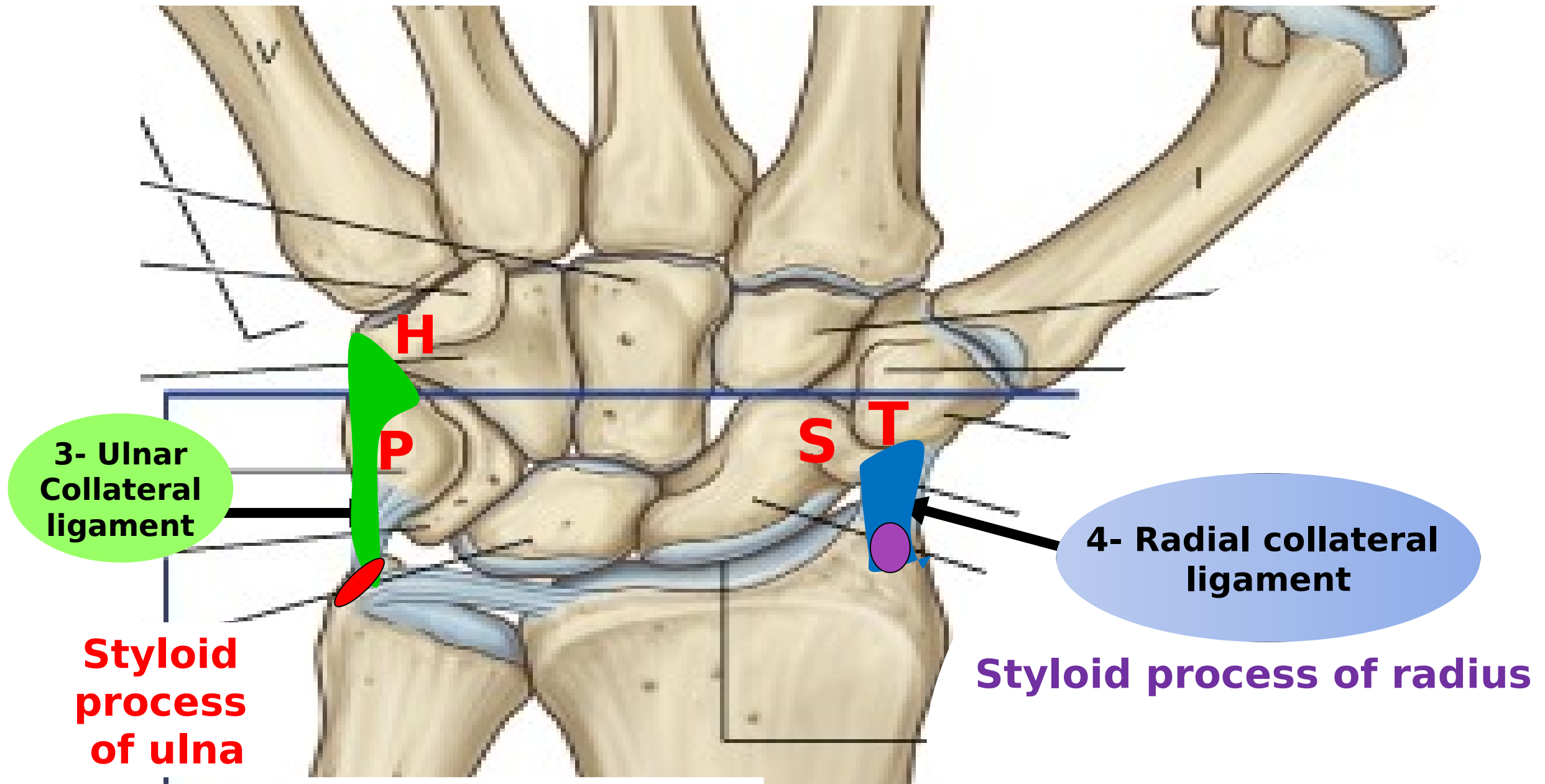
Ligaments of Wrist

Posterior [Dorsal] View

2- Posterior radiocarpal ligament



Frank H. Netter, 4th ed.



Elsevier. Drake et al: Gray's anatomy
for student- www.studentconsult.com

Ligaments of wrist joint



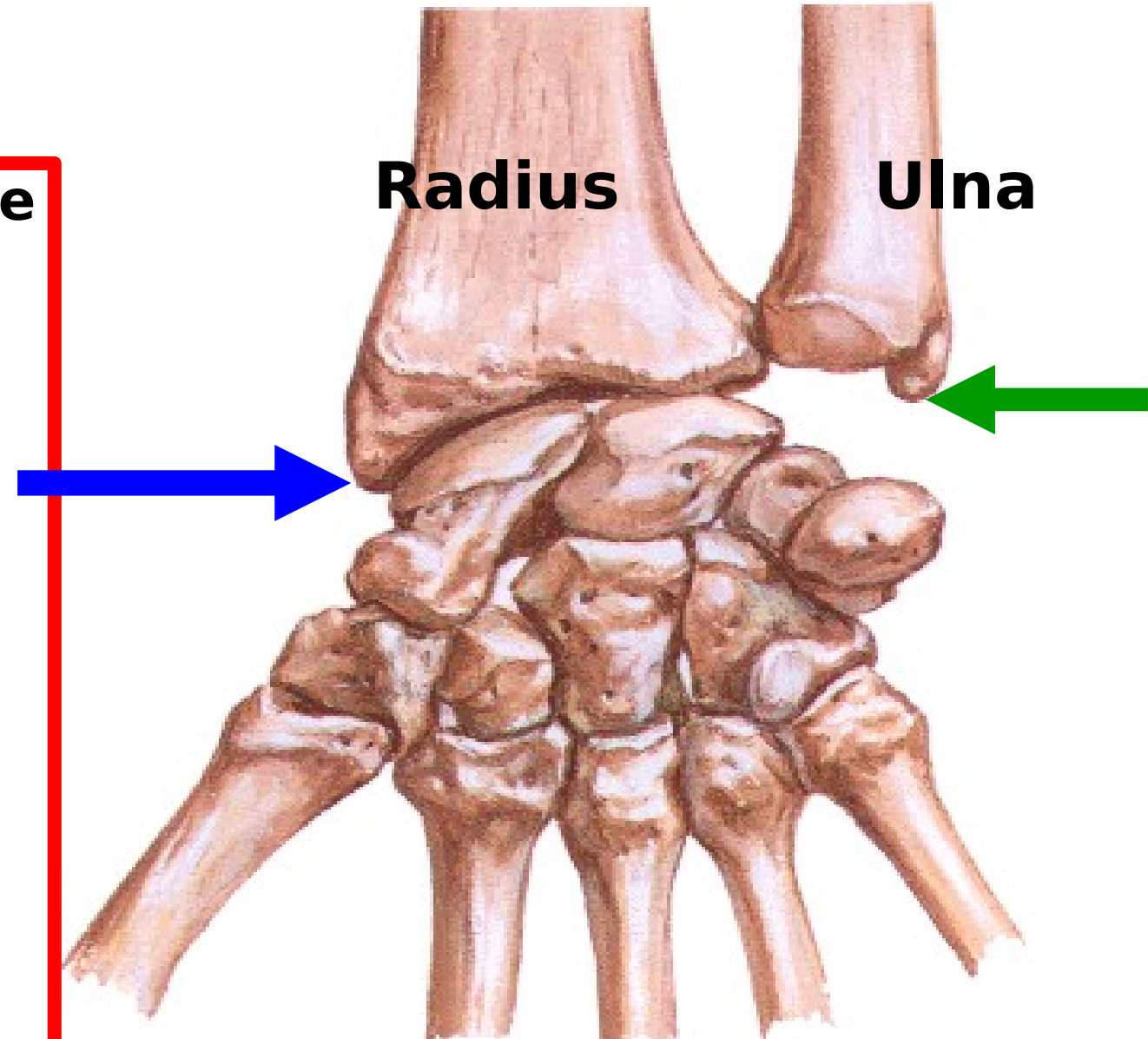
- 1) Ant. radio-carpal lig.** (on the ant. surface of the joint).
- 2) Post. radio-carpal lig.** (on the post. surface of the joint).
- 3) Ulnar collateral lig.** (between styloid process of **ulna** & pisiform + hamate).
- 4) Radial collateral lig.** (between styloid process of **radius** & scaphoid + trapezium).

Movements of wrist joint



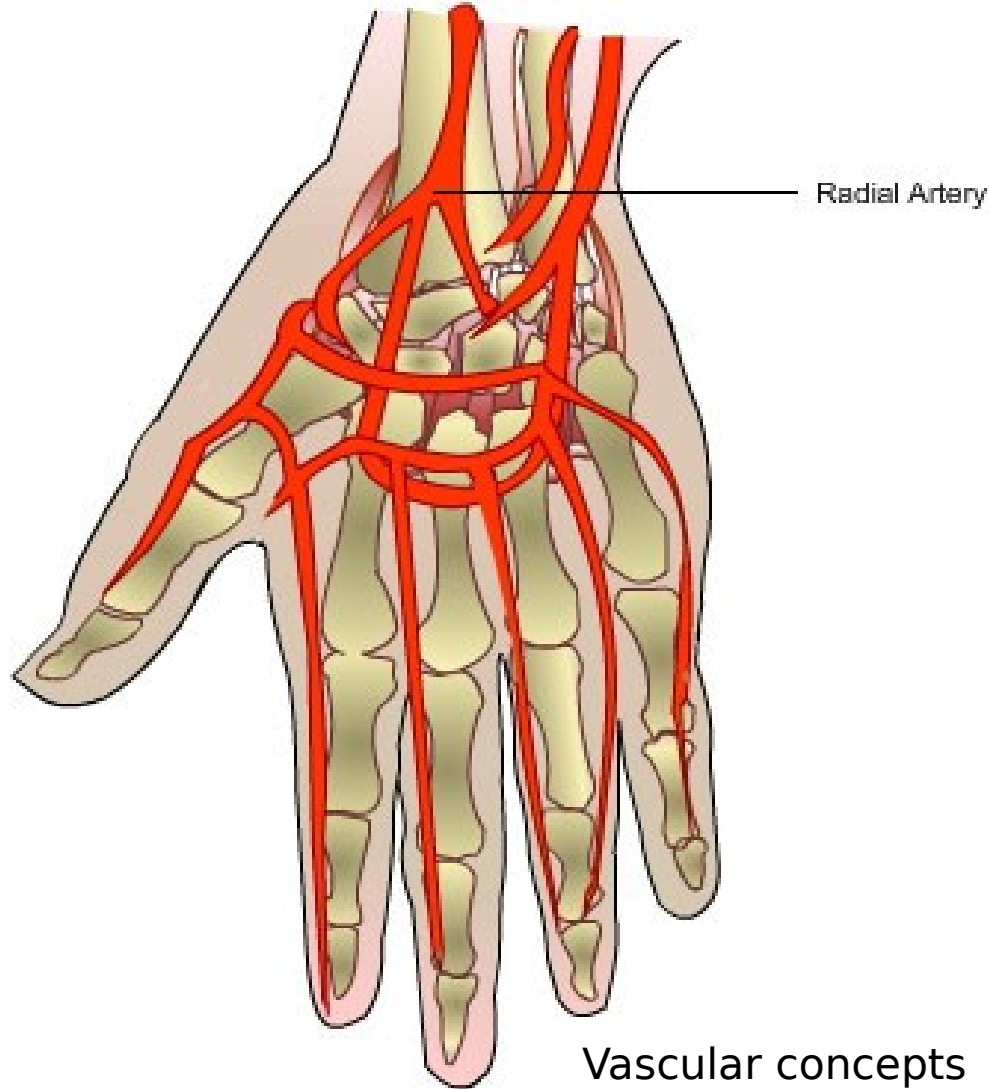
- **Flexion**
- **Extension**
- **Adduction**
- **Abduction**
- **Circumduction**
- **No rotation** (compensated by pronation & supination of forearm)

- Is the range of **adduction** of the hand at the wrist greater or lesser than the range of **abduction** and WHY???
- **ADDUCTION IS GREATER THAN ABDUCTION**
- Because the styloid process of **radius** is lower by 1 cm than the styloid process of **ulna**



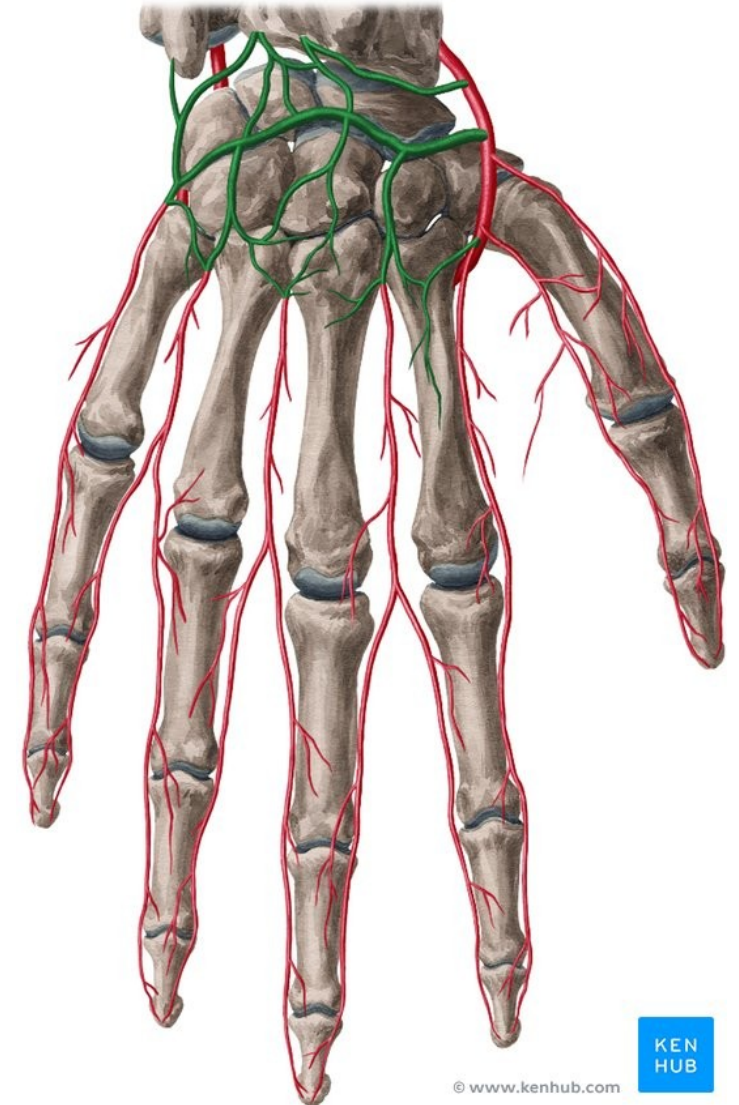
Frank H. Netter, 4th ed

Arterial supply



Vascular concepts

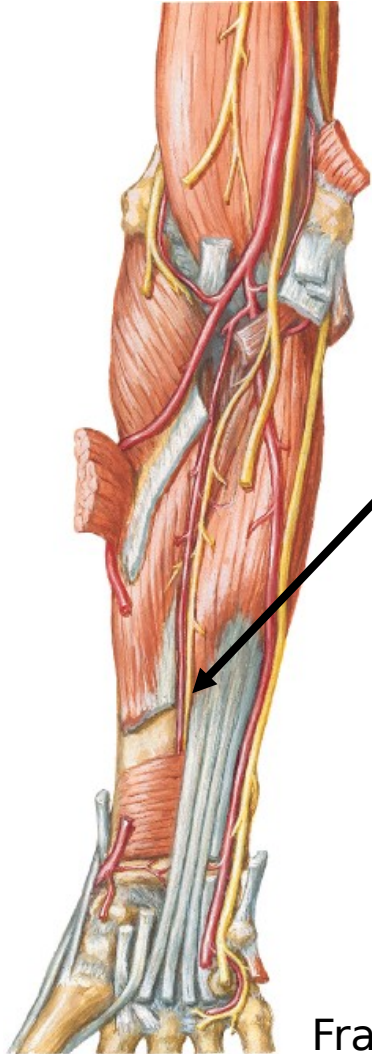
Via
the **palmar**
& **dorsal**
carpal
arch which
are derived
from the
radial and
ulnar
arteries.



© www.kenhub.com

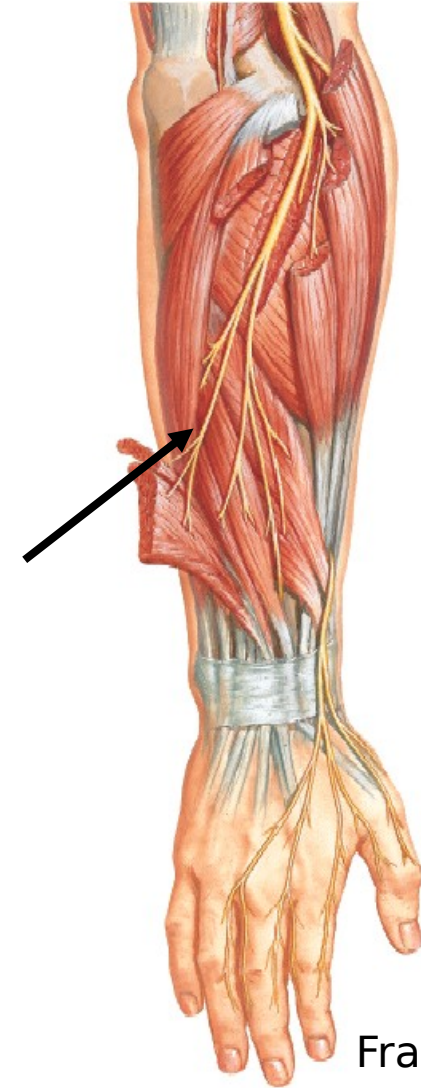


Nerve supply



- 1)Anterior
interosseous nerve.**
- 2)Posterior
interosseous nerve.**

Frank H. Netter, 4th ed.

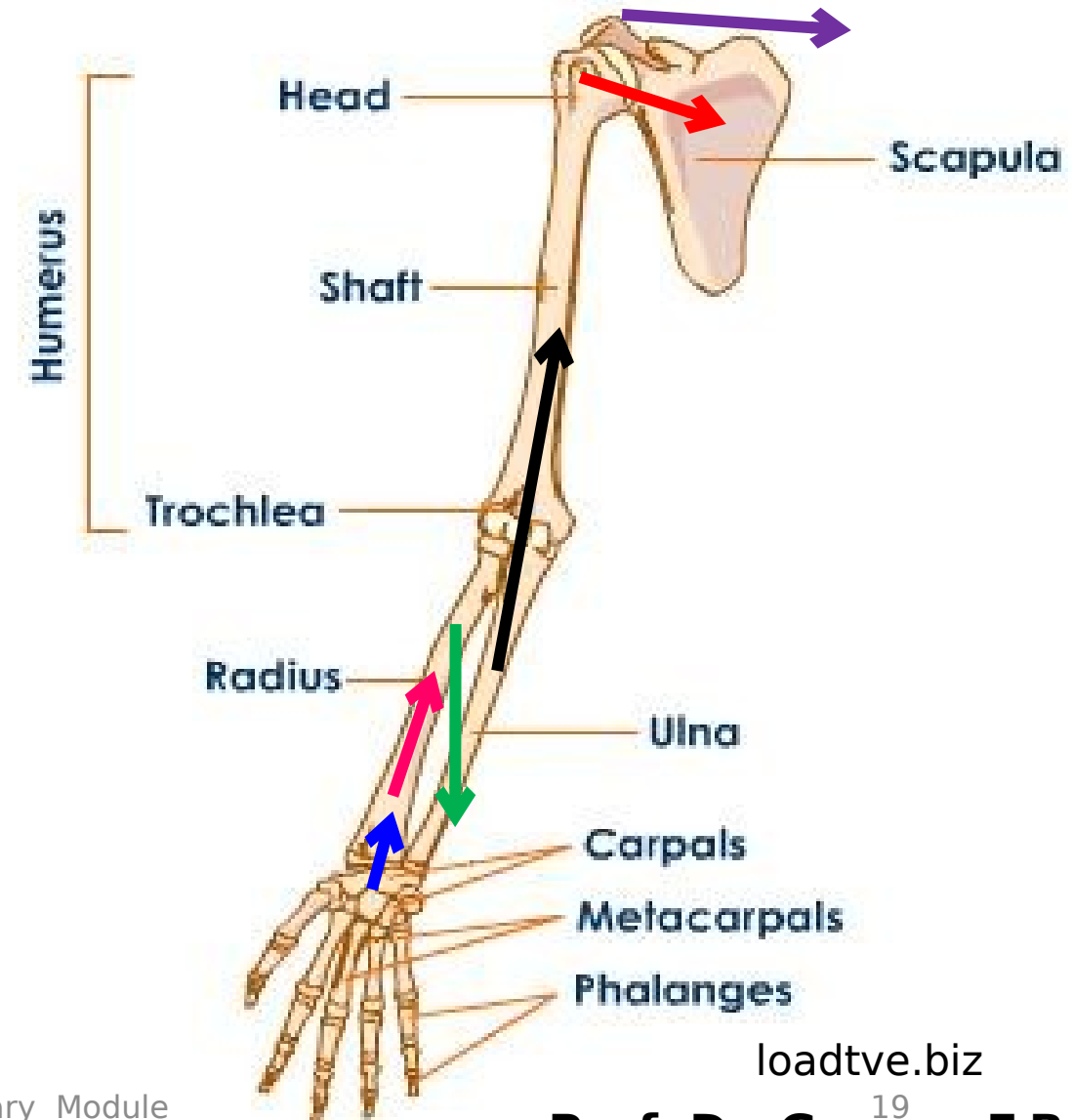


Frank H. Netter, 4th ed.

Clinically important points of wrist joint



- Fall on outstretched hands, forces are transmitted from the **scaphoid** → **distal end of the radius** → **across the interosseous membrane** → **ulna** → **humerus** → **glenoid fossa of the scapula** → **coracoclavicular ligament** → **clavicle** → **sternum**.



Relax, if you can



Joints of Hand

All hand joints are plane except 3



Intercarpal :

Midcarpal J.: **Plane** between proximal & distal rows

Carpo-metacarpal:

- 1- of the thumb (**saddle**).
- 2- of the rest fingers (**plane**).

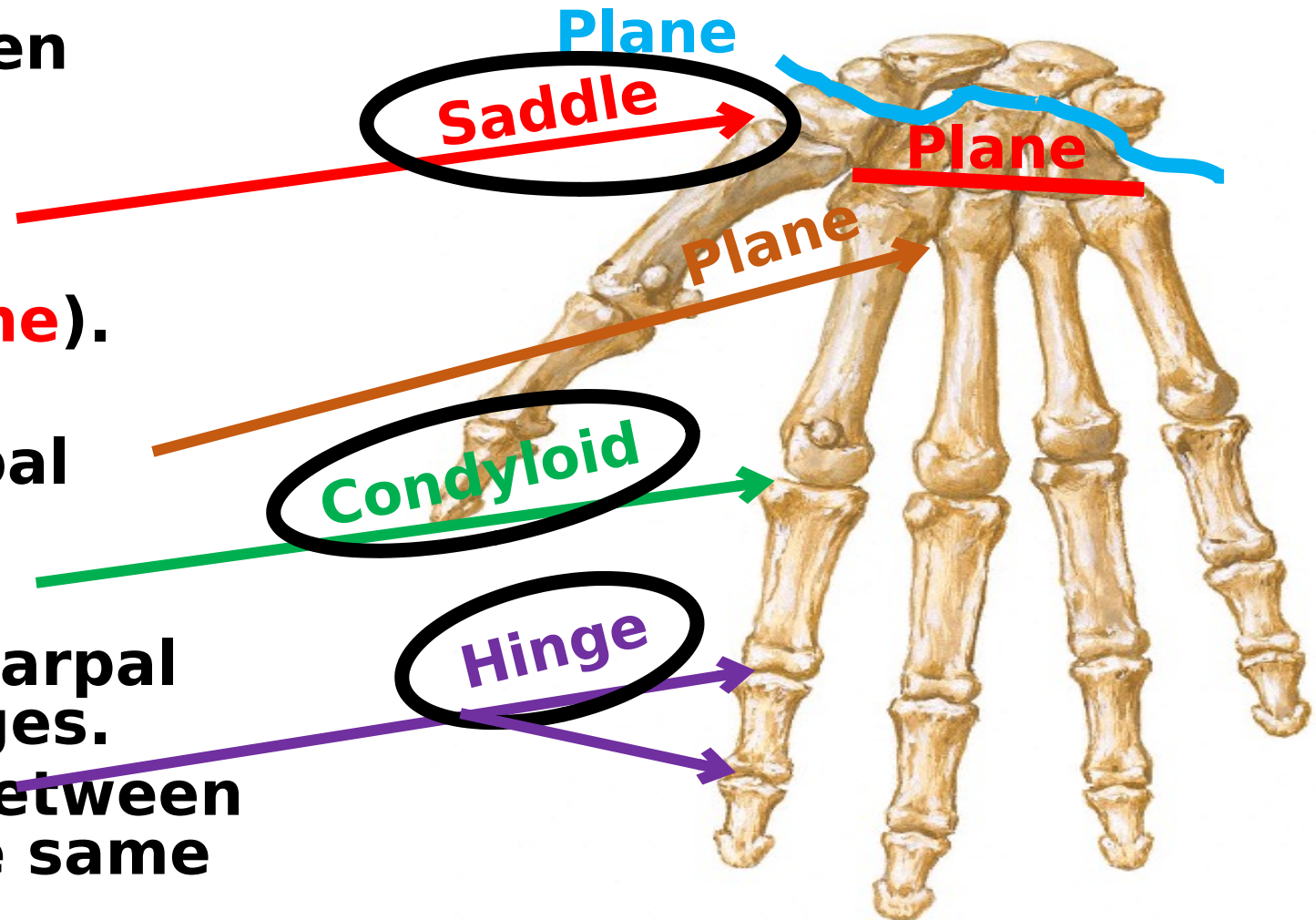
Inter-metacarpal:

Plane between metacarpal bones No. 2, 3, 4, 5.

Metacarpo-phalangeal:

Condyloid between metacarpal bones & proximal phalanges.

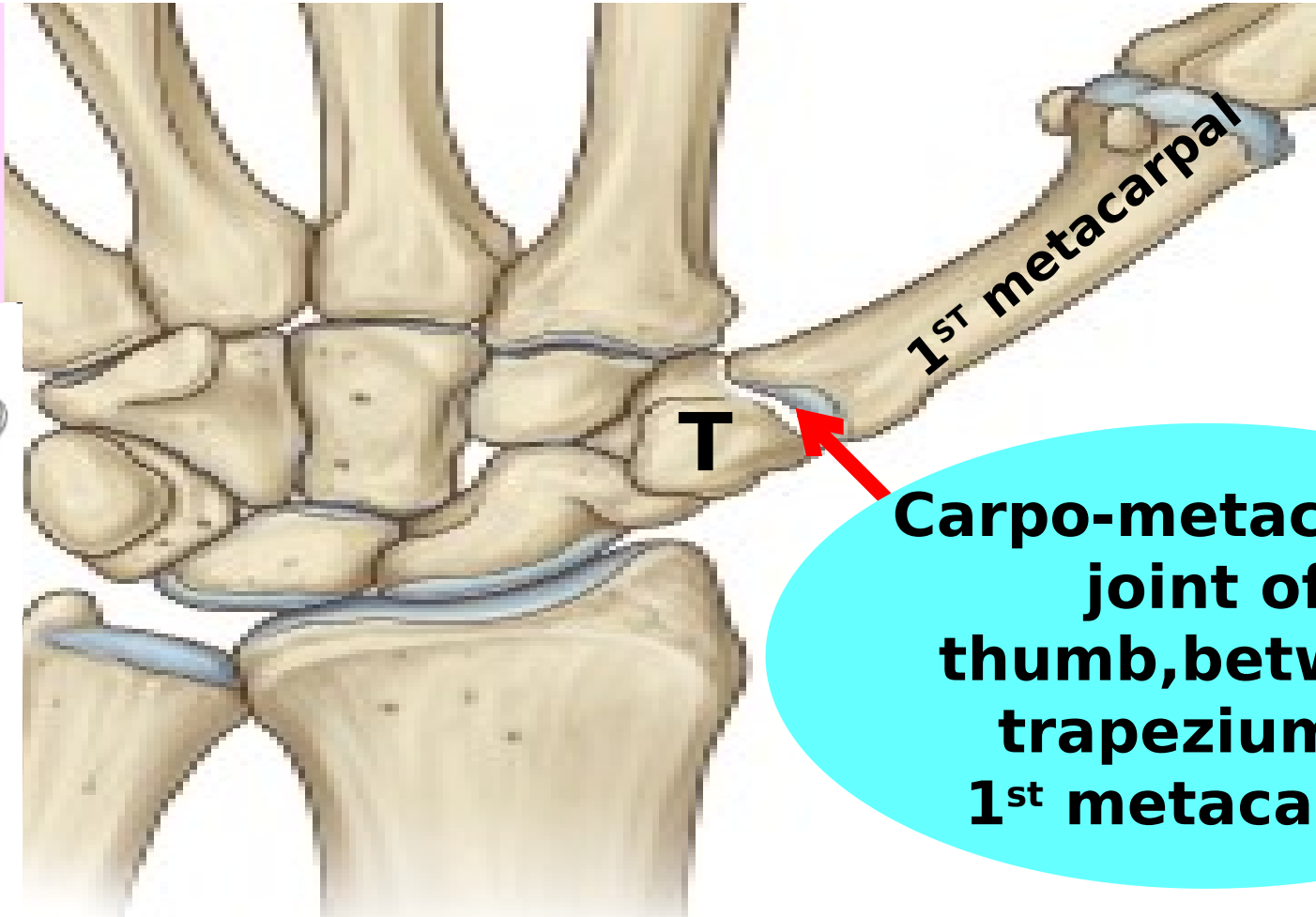
Interphalangeal: **Hinge** between adjacent phalanges of the same finger.



SADDLE JOINT



New Five Year Program



**Carpo-metacarpal
joint of
thumb, between
trapezium &
1st metacarpal**

Elsevier. Drake et al: Gray's
anatomy for student- [www.
studentconsult.com](http://www.studentconsult.com)

Musculoskeletal & Integumentary Module

Prof. Dr. George F.B.

**If you have a thumb, you'll
have a hand**

SADDLE JOINT

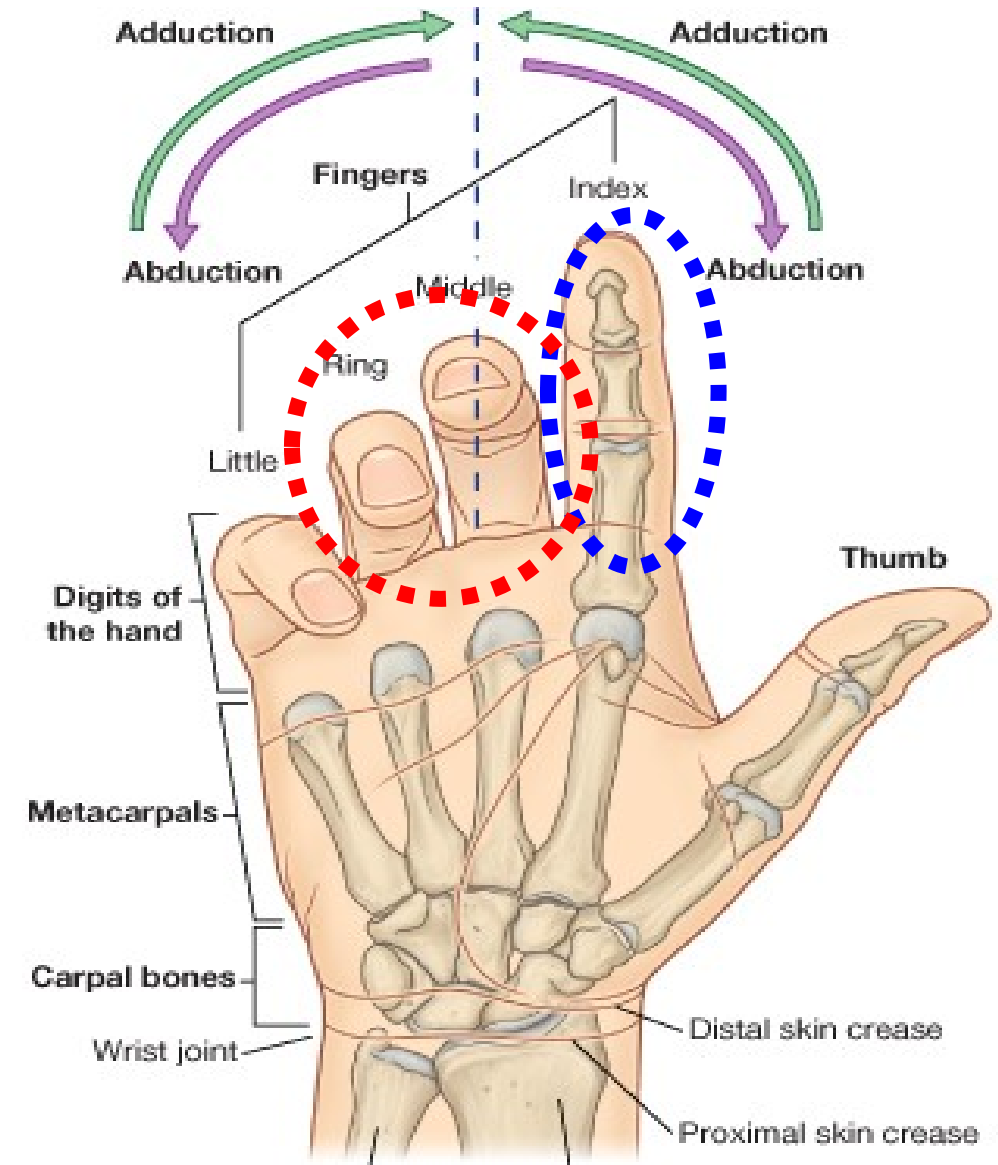
**Carpo-metacarpal
joint of
thumb, between
trapezium &
1st metacarpal**



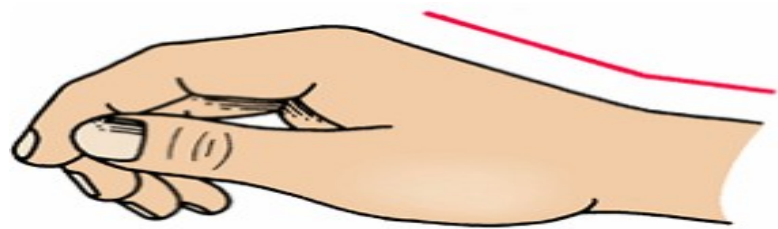
**This medially rotates the thumb 90° in order to
oppose other fingers**

• Movements of the med. 4 Fingers:

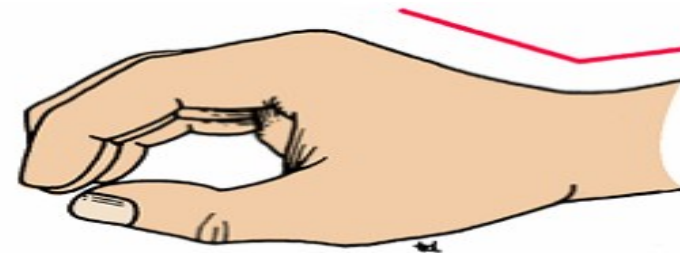
- 1) **Flexion** (fingers **perpendicular** to palm)
- 2) **Extension** (fingers in **same plane** with palm)
- 3) **Adduction** (**towards** middle finger)
- 4) **Abduction** (**away** from middle finger)



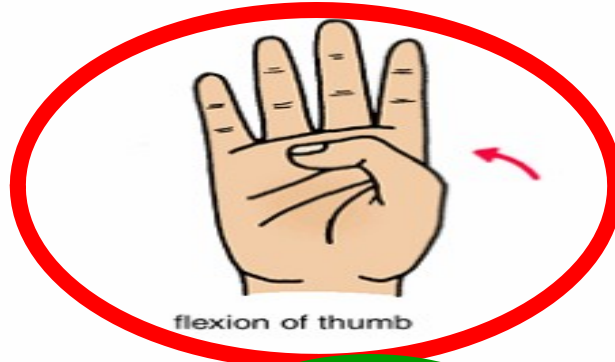
Elsevier. Drake et al: Gray's anatomy for student- www.studentconsult.com



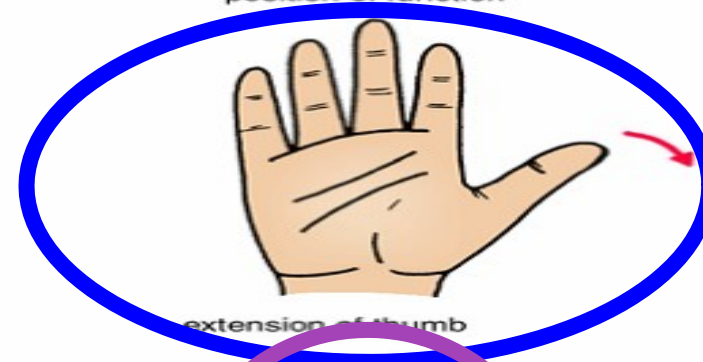
position of rest



position of function



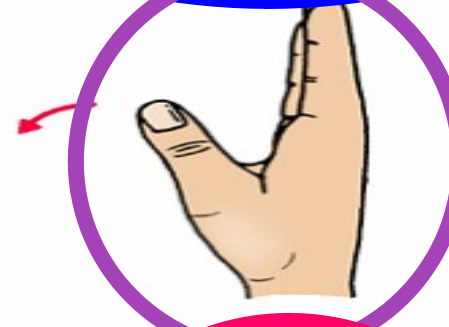
flexion of thumb



extension of thumb



abduction of thumb



adduction of thumb



opposition of thumb

**Ms.
performing
these
actions are
named
according
to their
function
e.g.
adductor
pollucis.**

Snell's clinical
anatomy

by region, or 26
Prof. Dr. George F.B.

Flexion of metacarpo-phalangeal joint

Extension of Interphalangeal joints

- **Lumbricals & interossei**, put the fingers in **the writing position** (flexion of metacarpo-phalangeal joints & extension of interphalangeal joints)

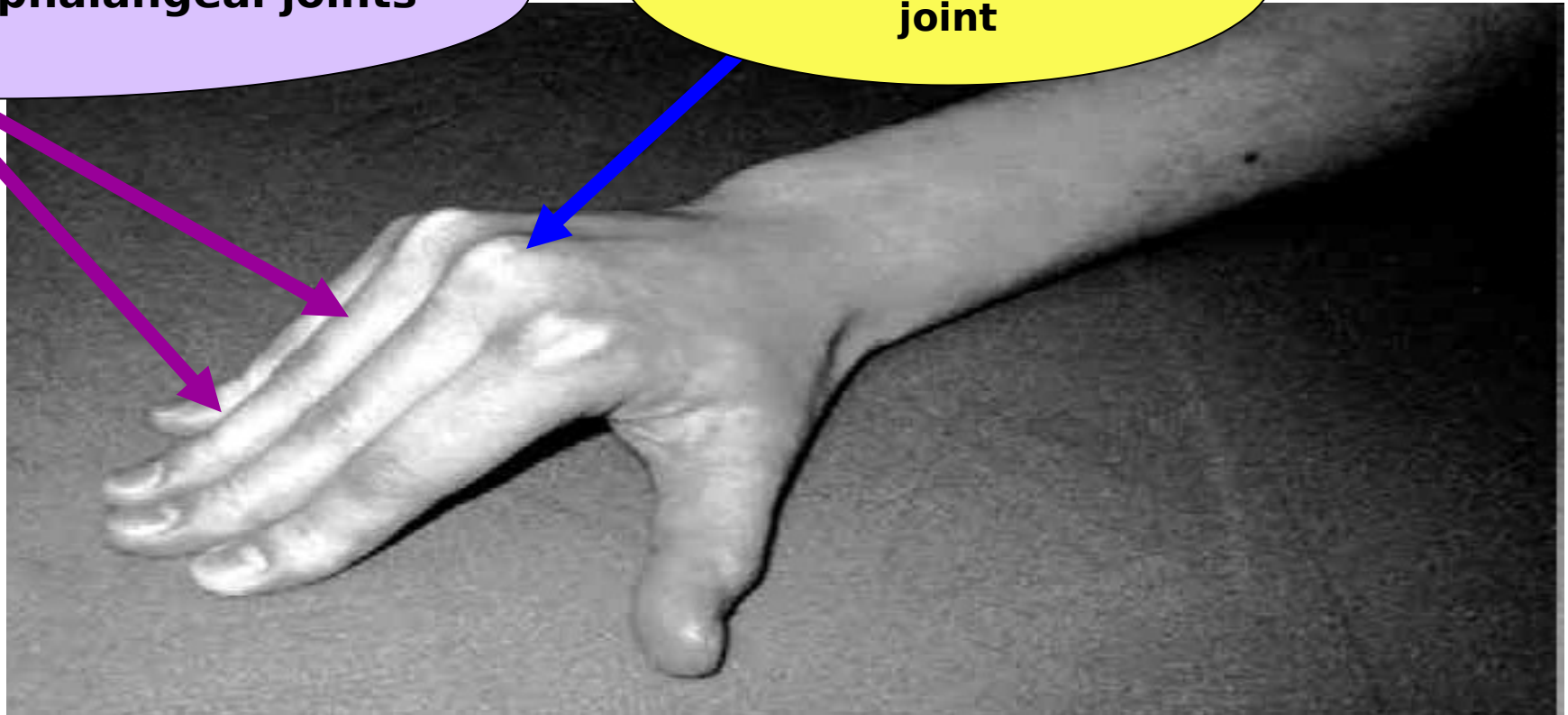


The writing position



extension of interphalangeal joints

**flexion of
metacarpophalangeal
joint**



Try to imagine what happens if lumbricals & interossei are paralyzed



Writing position

Flexion of metacarpophalangeal joints
Extension of interphalangeal joints

New Five Year Program



Claw hand (ulnar N. injury)

Extension of metacarpophalangeal joints
Flexion of interphalangeal joints

Musculoskeletal & Integumentary Module

Prof. Dr. George F.B.

Lecture Quiz



During a street fight, a 15-years-old male teen sustained a cut wound that injured his left ulnar nerve. As a result, he developed paralysis of his lumbricals & interossei muscles. Which of the following movements would be affected in the patient?

- A. Flexion of the carpo-metacarpal joints.**
- B. Extension of the carpo-metacarpal joints.**
- C. Flexion of the metacarpo-phalangeal joints.**
- D. Extension of the metacarpo-phalangeal joints.**
- E. Flexion of the proximal interphalangeal joints.**

Lecture Quiz **Answer**



During a street fight, a 15-years-old male teen sustained a cut wound that injured his left ulnar nerve. As a result, he developed paralysis of his lumbricals & interossei muscles. Which of the following movements would be affected in the patient?

- A. Flexion of the carpo-metacarpal joints.**
- B. Extension of the carpo-metacarpal joints.**
- C. Flexion of the metacarpo-phalangeal joints.**
- D. Extension of the metacarpo-phalangeal joints.**
- E. Flexion of the proximal inter phalangeal**

SUGGESTED TEXTBOOKS



Snell Clinical Anatomy by regions 9th edition, p. 411- 414 & figures 9.77, 9.78 in page 414.



The End